

Area of Triangles and Parallelograms

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Follow the instructions and please answer every question in depth.

Step 1: Open up Geometers Sketchpad on the computer

Step 2: Go to "File" then "Open". Type "gsp" in the search box.

Step 3: Open file "Area.gsp." You should now see a purple triangle.

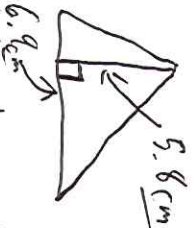
Step 4: Follow the instructions that are typed on the top of your screen. After you drag point A around the screen, describe below what you notice about the height, base, area, and perimeter below.

Everything but the base changes when I move point A around.

Merge point A and the top parallel line just as the instructions say. You will find the "Merge" tool under the "Edit" menu. Drag point A. Describe what you are noticing below.

The height, base, and area stays the same while the perimeter fluctuates

In the space below, draw two different triangles that have the same area. Explain how you know it to be true.



Because $b \cdot h \cdot \frac{1}{2} = \text{area}$ of triangle you can switch the area and the base around if you want.

Step 5: Click on the "Parallelogram" tab at the bottom of the screen. You should now see a blue rectangle. Drag point A across the screen. You should now see a light blue parallelogram and a purple square. Make a conjecture about the areas of these two figures.

These two figures areas are the same.

Now, calculate the areas of these two figures to see if your conjecture was correct.

Highlight the inside of the quadrilateral, and ONLY THE INSIDE OF THE QUADRILATERAL. Once this is done, click on "Measure" and then "Area." If your not able to calculate the area then you did it wrong.

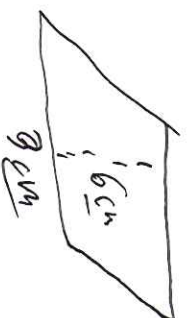
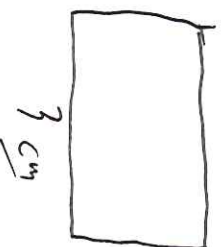
Area of parallelogram: 15.6 cm^2

Area of rectangle: 15.6 cm^2

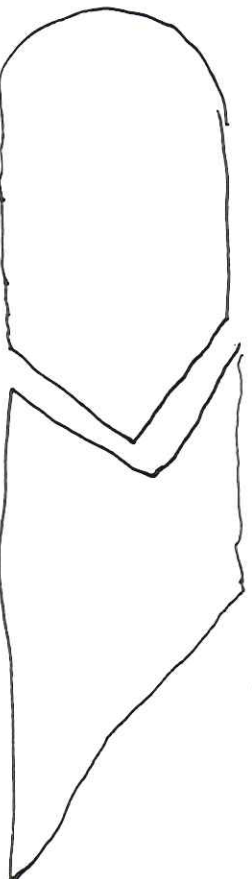
What do you notice about the two areas and why do you believe this is so?

They are the same because they are basically the same figure just on has different lengths of sides.

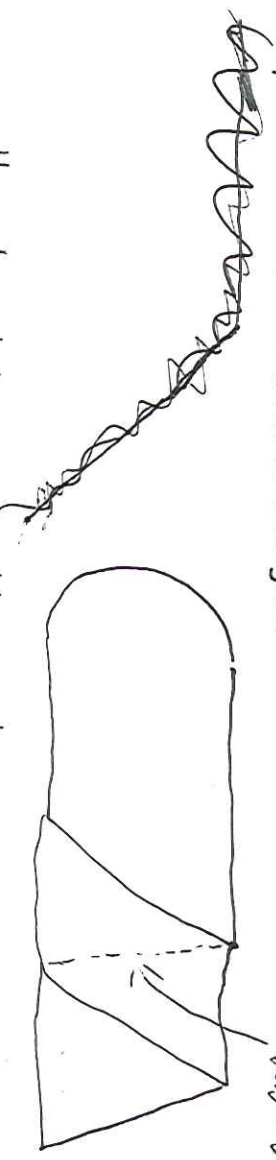
In the area below draw two different quadrilaterals with the same area.



Step 6: Click on the "Land Division" problem. DO NOT CLICK ON HINT! Read through the problem written at the top. Copy a sketch of the yellow figure with white line in the space below.



In the space below draw the picture of your solution to their problem, then explain why you believe this will work. Only click on hint after at least 5 minutes of thinking about this. Remember what you know about the areas of triangles.



As long as the two triangles in the shape are the same they should end up with the same amount of land because the base and the altitude are the same.

Step 7: Click on "Polygon Reduction" at the bottom of the screen. If it's not shown, click on the small arrow in order to show more choices. Read through the instructions on the page.

Attempt to construct the quadrilateral. I must see this before you are completed with the days assignment.

Describe how you made this pentagon into a quadrilateral with the same area and accompany your explanation with a picture.

Step 8: Construct a hexagon with the same area as the pentagon, or on a new sketch construct a hexagon then find the quadrilateral with the same area. (Extension Activity)

